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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/632,113	08/01/2003	Maki Ito	Q76707	3482

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EXAMINER	
MRUK, GEOFFREY S	

ART UNIT	PAPER NUMBER
2853	

DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/632,113	ITO, MAKI	
	Examiner	Art Unit	
	Geoffrey Mruk	2853	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 3 is objected to because of the following informalities:

Claim 3 states "the width y of the pressure generating chamber at the vibration side is defined by the outer edges at both sides of the space portion". Examiner suggests changing y to y' in light of Figure 5. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 2, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada (EP 0963846 A2) in view of Mukoyama (JP 04257446 A).

With respect to claim 1, the primary reference of Shimada discloses a liquid-jet head (Fig.1) comprising:

- a passage-forming substrate (Fig. 2B, element 10) on which pressure generating chambers (Fig. 2B, element 12) communicating with nozzle orifices (Fig. 2B, element 11) are defined, and
- a piezoelectric element (Fig. 2B, element 300) composed of a lower electrode (Fig. 2B, element 60), a piezoelectric layer (Fig. 2B, element 70) and an upper

electrode (Fig. 2B, element 80), which are provided on the passage-forming substrate while interposing a vibration plate (Fig. 2B, element 50) there between,

- wherein both ends in a width direction (Fig. 6) of the piezoelectric layer at a pressure generating chamber side are positioned in a region facing the pressure generating chamber.

With respect to claim 4, the primary reference of Shimada discloses the pressure generating chambers are formed in a single crystal silicon substrate by anisotropic etching (Column 13, lines 54-58), and each layer of the piezoelectric element is formed by deposition and a lithography method (Claim 54).

With respect to claim 5, the primary reference of Shimada discloses a liquid-jet head (Fig.1).

However, Shimada fails to disclose:

- With respect to claim 1, a relationship between a width x of a portion of the piezoelectric layer provided on a lower electrode, the portion of the piezoelectric layer being located directly facing the lower electrode and at the pressure generating chamber side, and a width y of the pressure generating chamber at the vibration plate side satisfies $0.75 \leq x/y \leq 1$.
- With respect to claim 2, the width x of the piezoelectric layer at the pressure generating chamber side and the width y of the pressure generating chamber at the vibration plate side are equal.

The secondary reference of Mukoyama discloses "The ratio of the width of the piezoelectric crystal element 30 to that of the pressure chamber 20 is within a range

from 0.8 to 1.0" (English Abstract) and the width of the pressure generating chamber at the vibration plate side are equal (Fig. 3 and the range disclosed in the English Abstract).

Therefore, in view of the teachings of the secondary reference, one of ordinary skill in the art would have been motivated to modify the primary reference using the ratio of the width of the piezoelectric crystal element to that of the pressure chamber. The motivation for doing so would have been "so that ink drops are efficiently spouted" (English Abstract).

2. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being obvious over Matsuzawa et al. (US 6,712,456 B2) in view of Mukoyama (JP 04257446 A).

The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer

in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

With respect to claim 1, the primary reference of Matsuzawa discloses a liquid-jet head (Fig. 1) comprising:

- a passage-forming substrate (Fig. 10B, element 10) on which pressure generating chambers (Fig. 10B, element 11) communicating with nozzle orifices (Fig. 10B, element 21) are defined, and
- a piezoelectric element (Fig. 10B, element 300) composed of a lower electrode (Fig. 10B, element 60), a piezoelectric layer (Fig. 10B, element 70) and an upper electrode (Fig. 10B, element 80), which are provided on the passage-forming substrate while interposing a vibration plate (Fig. 10B, element 50) there between,
- wherein both ends in a width direction (Fig. 10B) of the piezoelectric layer at a pressure generating chamber side are positioned in a region facing the pressure generating chamber.

With respect to claim 3, the primary reference of Matsuzawa discloses the pressure generating chamber (Fig. 10B, element 11) has a space portion (Fig. 10B, element 41A), the space being provided at a periphery of an opening of the pressure generating chamber at the vibration plate side (Fig. 10B, element 50), the width y of the pressure generating chamber at the vibration plate side is defined by outer edges (Fig. 10B, element 50a) at both sides of the space portion.

With respect to claim 4, the primary reference of Matsuzawa discloses the pressure generating chambers are formed in a single crystal silicon substrate by anisotropic etching (Column 5, lines 17-22), and each layer of the piezoelectric element is formed by deposition and a lithography method (Column 5, lines 34-45).

With respect to claim 5, the primary reference of Matsuzawa discloses a liquid-jet head (Fig.1).

With respect to claim 6, the primary reference of Matsuzawa discloses the lower electrode (Fig. 10B, element 60) extends beyond an area facing the pressure generating chamber (Fig. 10B, element 11) to an area facing compartment walls (Fig. 10B, element 10), which are present on both sides, in a width direction (Fig. 10B), of the pressure generating chamber.

However, Matsuzawa fails to disclose:

- With respect to claim 1, a relationship between a width x of a portion of the piezoelectric layer provided on a lower electrode, the portion of the piezoelectric layer being located directly facing the lower electrode and at the pressure generating chamber side, and a width y of the pressure generating chamber at the vibration plate side satisfies $0.75 \leq x/y \leq 1$.
- With respect to claim 2, the width x of the piezoelectric layer at the pressure generating chamber side and the width y of the pressure generating chamber at the vibration plate side are equal.

The secondary reference of Mukoyama discloses "The ratio of the width of the piezoelectric crystal element 30 to that of the pressure chamber 20 is within a range

from 0.8 to 1.0" (English Abstract) and width of the piezoelectric layer at the pressure generating chamber side and the width of the pressure generating chamber at the vibration plate side are equal (Fig. 3 and the range disclosed in the English Abstract).

Therefore, in view of the teachings of the secondary reference, one of ordinary skill in the art would have been motivated to modify the primary reference using the ratio of the width of the piezoelectric crystal element to that of the pressure chamber. The motivation for doing so would have been "so that ink drops are efficiently spouted" (English Abstract).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is (571) 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

GSM
4/29/2005

GM

MANISH S. SHAH
PRIMARY EXAMINER

5/2/05